

Pending Claims
Accompanying November 5, 2002 Response
For U.S. Serial No. 09/193,928
(Docket No. 9626/OL207)

1. A light-weight golf club shaft comprising, sequentially:

said golf club shaft having a longitudinal axis;

an inner layer;

said inner layer being a first angled layer concentric with said longitudinal axis;

said first angular layer having a circular cross section;

a first straight layer formed on said first angled layer;

said first straight layer being concentric with said longitudinal axis and having a circular cross section;

a second angled layer formed on said first straight layer;

said second angled layer being concentric with said longitudinal axis and having a circular cross section;

a second straight layer formed on said second angled layer;

said second straight layer being an outer layer concentric with said longitudinal axis and having a circular cross section;

said shaft having a length along a longitudinal direction;

each of said layers extend over an entirety of said length of said shaft;

each of said layers includes fiber-reinforced composite material containing reinforcing fibers;

said reinforcing fibers of said second angled layer being oriented at an angle relative to said longitudinal direction of said shaft; and

said second angled layer having at least one of said angle and a thickness effective to provide said shaft with a torsional strength of at least 120 kgf x m x degrees and a weight of from 30 to 40 g.

21. A light-weight golf club shaft, said shaft having a length along a longitudinal direction, comprising:

a first angled layer;

a first straight layer formed on said first angled layer;

a second angled layer formed on said first straight layer;

a second straight layer formed on said second angled layer;

each of said layers extend over said length of said shaft and include fiber-reinforced composite material, said fiber-reinforced composite material containing reinforcing fibers;

said first angled layer and said second angled layer each being formed by bonding a first layer and a second layer, said first layer having reinforcing fibers oriented at a first angle relative to an axial direction of said shaft and said second layer having reinforcing fibers oriented at a second opposite angle, relative to an axial direction of said shaft;

said reinforcing fibers of said second angled layer oriented at an angle in a range of from 35 to 75 degrees relative to said longitudinal direction of said shaft;

said second angled layer has a thickness in a range of from 0.04 to 0.1 mm;

said shaft has a small-diameter end and a large-diameter end;

said first angled layer has a first thickness near said small-diameter end of said shaft;

said first angled layer has a second thickness near said large-diameter end of said shaft;

said first thickness is substantially twice said second thickness; and

said layers are effective to provide said shaft with a torsional strength of at least 120

kgf x m x degrees and a weight of from 30 - 40 g.